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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,580	06/04/2001	Harumitsu Fujita	P-171-196	5456

7590

12/03/2003

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EXAMINER

TOLEDO, FERNANDO L

PAPER NUMBER

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/873,580	Applicant(s) FUJITA, HARUMITSU	
	Examiner Fernando Toledo	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/021,519.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>20030814</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 9 – 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al. (U. S. patent 5,396,098).

In re claim 9, Kim in the U. S. patent 5,396,098; figures 1 – 12 and related text, providing a semiconductor substrate 21 having at least first and second active regions of a first conductivity type; forming a gate oxide layer 22 having a first thickness onto at least the first and second active regions; forming an electrode layer 23 onto the gate oxide layer; patterning the gate electrode layer to form first and second gate electrodes onto the first and second active regions, respectively (Figure 8); doping the first active region and the first gate electrode with an impurity of a second conductivity type which is opposite to the first conductivity type to form a first transistor driven at a first voltage level, the gate electrode being doped at a first concentration (Figure 9); and doping the second active region and the second gate electrode with an impurity of the second conductivity type to form a second transistor driven at a second voltage level lower than the first voltage level, the second gate electrode being doped at a second concentration higher than the first concentration (Figure 10).

3. In re claim 10, Kim teaches wherein the doping steps include implanting ions of an impurity in the first and second active regions and the first and second gate electrodes (Figures 9 -- 10).
4. In re claim 11, Kim teaches wherein the lower concentration of impurities in the first gate electrode causes the creation of a depletion region in the first gate electrode when driving voltage is applied thereto (Figure 8).
5. In re claim 12, Kim teaches wherein the first active region and the first gate electrode are doped simultaneously (Figure 9).
6. In re claim 13, Kim teaches wherein the second active region and the second gate electrode are doped simultaneously (Figure 10).
7. In re claim 14, Kim teaches further including the step of forming a gate oxide 22 under each of the gate electrodes.
8. In re claim 15, Kim teaches wherein both of the gate oxides are the same thickness (Figures 7 – 12).
9. In re claim 19, Kim discloses wherein the depletion region in the gate electrode makes a dielectric makes a dielectric breakdown voltage between the gate electrode and the drain region higher (Figures 9 and 10).
10. In re claim 20, Kim discloses (a) doping a high voltage circuit at a low impurity concentration; and (b) doping a low voltage circuit at a high concentration after the step (a) (Figures 7 – 10).
11. In re claim 21, Kim discloses (c) forming a sidewall spacer after the step (a) and before step (b). (Figure 11).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 16 – 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim as applied to claims 9 – 15 above, and further in view of Tigelaar et al. (U. S. patent 5,595,922).

In re claim 16, Kim does not show wherein both of the gate oxides have a shape wherein they are thicker at side edges of the gate electrodes than at the center thereof.

However, Tigelaar in the U. S. patent 5,595,922; figures 1 - 5 and related text, discloses wherein both of the gate oxides have a shape wherein they are thicker at side edges of the gate electrodes than at the center thereof since they seal the gate structure so as to reduce any electrical leakage from the gate structure (column 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the gate oxide of Kim wherein both of the gate oxides have a shape wherein they are thicker at side edges of the gate electrodes than at the center thereof, as taught by Tigelaar, since they seal the gate structure so as to reduce any electrical leakage from the gate structure.

14. In re claim 17, Kim does not show further including oxidizing the side walls of the gate electrodes, the gate oxides under each of the gate electrode being formed while the sidewalls are oxidized.

Tigelaar discloses oxidizing the side walls of the gate electrodes, the gate oxides under each of the gate electrode being formed while the sidewalls are oxidized, since they seal the gate structure so as to reduce any electrical leakage from the gate structure (column 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the gate oxide of Kim oxidizing the side walls of the gate electrodes, the gate oxides under each of the gate electrode being formed while the sidewalls are oxidized, as taught by Tigelaar, since they seal the gate structure so as to reduce any electrical leakage from the gate structure.

15. In re claim 18, Kim does not show further including oxidizing the side walls of the gate electrodes, the gate oxides under each of the gate electrode being formed while the sidewalls are oxidized.

Tigelaar discloses oxidizing the side walls of the gate electrodes, the gate oxides under each of the gate electrode being formed while the sidewalls are oxidized, since they seal the gate structure so as to reduce any electrical leakage from the gate structure (column 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the gate oxide of Kim oxidizing the side walls of the gate electrodes, the gate oxides under each of the gate electrode being formed while the sidewalls are oxidized, as taught by Tigelaar, since they seal the gate structure so as to reduce any electrical leakage from the gate structure.

Response to Arguments

16. Applicant's arguments filed 14 August 2003 have been fully considered but they are not persuasive for the following reasons.

17. Applicant contests that Kim discloses that the gate electrode is formed of doped polysilicon instead of undoped polysilicon.

Examiner respectfully submits that Kim discloses that the polysilicon can be undoped polysilicon as well as doped polysilicon (Column 4, Lines 25 – 29).

18. Applicant contests that the rejection of claim 11 is addressed by Figures 9 and 10 and those figures do not show forming electrodes.

Examiner respectfully submits that Figure 7 does show forming the gate electrodes. Applicant is reminded that the reference is used as a whole to formulate the rejection.

Conclusion

19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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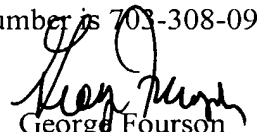
however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando Toledo whose telephone number is 703-305-0567. The examiner can normally be reached on Mon-Fri 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


F Toledo


George Fourson
Primary Examiner
Art Unit 2823